

SEQUENCE LISTING

<110> Cahoon, Rebecca E.  
Klein, Theodore M.  
Odell, Joan T.  
Orozco, Emil M. Jr.

<120> PLANT CELL CYCLIN GENES

<130> BB1149 US NA

<150> 60/078,735

<151> 1998 March 20

<150> PCT/US99/06047

<151> 1999 March 19

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35 40 45

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50 55 60

Val Asp Trp Leu Val Glu Val Ala Glu Glu Tyr Lys Leu Val Ala Asp  
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260							265						270		
Phe	Lys	Cys	Val	Ser	Leu	Ile	Leu	Val	Pro	Val	Val	Ile	Pro	Thr	Ser
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20 25 30

Gly Glu Leu Pro Asn Leu Gln Asn Leu Ile Val Ser Glu Thr Gln Asn  
35 40 45

Xaa Arg Lys Glu Lys Xaa Leu Cys Xaa Lys Asn Pro Asn Glu Lys Lys  
50 55 60

Pro Ser Pro Thr Asn Asn Asn Thr Phe Pro Ser Pro Gln Ile Xaa Glu  
65 70 75 80

Ser Tyr Asp Ser Asp Ile His Gly Tyr Leu Arg Glu Met Glu Met Gln  
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 aaaatggcac ncgacatcg actgcaangg aatccacccctc gagcatanac tnaatcaaaa 780
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Gly Leu Asn Val Ile Asp Ile Asp Lys Asp Asn Gly Asn Pro Gln Met
   
 35 40 45

Cys Ala Ser Tyr Ala Ala Glu Ile Tyr Arg Asn Leu Met Ala Ala Glu
   
 50 55 60

Leu Ile Arg Arg Pro Lys Ser Asn Tyr Met Glu Thr Leu Gln Arg Asp
   
 65 70 75 80

Ile Thr Lys Gly Met Arg Gly Ile Leu Ile Asp Trp Ala Leu Arg Phe
   
 85 90 95

Leu Glu Glu Tyr Lys Leu Leu Pro Asp Thr Leu Tyr Leu Thr Val Tyr  
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 Leu Ile Asp Gln Phe Leu Ser Arg Lys Tyr Ile Glu Arg Gln Lys Leu  
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 145 150 155 160  
 Tyr Thr Lys Asn Gln Val Leu Lys Met Glu Cys Glu Val Leu Asn Asp  
 165 170 175  
 Leu Gly Phe His Leu Ser Val Pro Thr Ile Lys Thr Phe Leu Arg Arg  
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 Asp Gly Ala Gly Thr Asp Leu Val Val Ala Arg Asp Glu Arg Leu Leu  
 35 40 45  
  
 Val Val Asp Gln Asp Glu Glu Tyr Val Ala Leu Leu Leu Ser Lys Glu  
 50 55 60  
  
 Ser Ala Ser Gly Gly Gly Pro Val Glu Glu Met Glu Asp Trp Met  
 65 70 75 80  
  
 Lys Ala Ala Arg Ser Gly Cys Val Arg Trp Ile Ile Lys Thr Thr Ala  
 85 90 95  
  
 Met Phe Arg Phe Gly Gly Lys Thr Ala Tyr Val Ala Val Asn Tyr Leu  
 100 105 110  
  
 Asp Arg Phe Leu Ala Gln Arg Arg Val Asn Arg Glu His Ala Trp Gly  
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 Leu Gln Leu Leu Met Val Ala Cys Met Ser Leu Ala Thr Lys Leu Glu  
 130 135 140  
  
 Glu His His Ala Pro Arg Leu Ser Glu Phe Pro Leu Asp Ala Cys Glu  
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 Phe Ala Phe Asp Ser Ala Ser Ile Leu Arg Met Glu Leu Leu Val Leu  
 165 170 175  
  
 Gly Thr Leu Glu Trp Arg Met Ile Ala Val Thr Pro Phe Pro Tyr Ile  
 180 185 190  
  
 Ser Tyr Phe Ala Ala Arg Phe Arg Glu Thr Ser Ala Gly Arg Ile Leu  
 195 200 205  
  
 Met Arg Ala Val Glu Cys Val Phe Ala Ala Ile Lys Val Ile Ser Ser  
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Asp Arg Phe Leu Ala Arg Arg Cys Val Asp Arg Asp Lys Glu Trp Ala  
35 40 45

Leu Gln Leu Leu Ser Val Ala Cys Leu Ser Leu Ala Ala Lys Val Glu  
50 55 60

Glu Arg Arg Pro Pro Arg Leu Pro Glu Phe Lys Leu Asp Met Tyr Asp  
65 70 75 80

Cys Ala Ser Leu Met Arg Met Glu Leu Leu Val Leu Thr Thr Leu Lys  
85 90 95

Trp Gln Met Ile Thr Glu Thr Pro Phe Ser Tyr Leu Asn Cys Phe Thr  
100 105 110

Ala Lys Phe Arg His Asp Glu Arg Lys Ala Ile Val Leu Arg Ala Ile  
115 120 125

Glu Cys Ile Phe Ala Ser Ile Lys Val Ile Ser Ser Val Gly Tyr Gln  
130 135 140

Pro Ser Thr Ile Ala Leu Ala Ala Ile Leu Ile Ala Arg Asn Lys Glu  
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Gln Leu Met Met Leu  
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<400> 12

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Ser Ser Gly Ile Leu Ser Gly Glu Ser Pro Glu Cys Ser Phe Ser Asp  
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Ile Asp Ser Ser Pro Pro Pro Ser Pro Thr Thr Glu Asp Cys Tyr  
35 40 45

Ser Ile Ala Ser Phe Ile Glu His Glu Arg Asn Phe Val Pro Gly Phe  
50 55 60

Glu Tyr Leu Ser Arg Phe Gln Ser Arg Ser Leu Asp Ala Asn Ala Arg  
65 70 75 80

Glu Glu Ser Val Gly Trp Ile Leu Lys Val His Ala Tyr Tyr Gly Phe  
85 90 95

Gln Pro Leu Thr Ala Tyr Leu Ala Val Asn Tyr Met Asp Arg Phe Leu  
100 105 110

Asp Ser Arg Arg Leu Pro Glu Thr Asn Gly Trp Pro Leu Gln Leu Val  
115 120 125

Ser Val Ala Cys Leu Ser Leu Ala Ala Lys Met Glu Glu Pro Leu Val  
130 135 140

Pro	Ser	Leu	Leu	Asp	Leu	Gln	Ile	Glu	Gly	Ala	Lys	Tyr	Ile	Phe	Glu
145					150					155				160	
Pro	Arg	Thr	Ile	Arg	Arg	Met	Glu	Leu	Leu	Val	Leu	Gly	Val	Leu	Asp
	165						170			175					
Trp	Arg	Leu	Arg	Ser	Val	Thr	Pro	Leu	Cys	Phe	Leu	Ala	Phe	Phe	Ala
	180					185					190				
Cys	Lys	Val	Asp	Ser	Thr	Gly	Thr	Phe	Ile	Arg	Phe	Leu	Ile	Ser	Arg
	195					200				205					
Ala	Thr	Glu	Ile	Ile	Val	Ser	Asn	Ile	Gln	Glu	Ala	Ser	Phe	Leu	Ala
	210				215					220					
Tyr	Trp	Pro	Ser	Cys	Ile	Ala	Ala	Ala	Ile	Leu	Thr	Ala	Ala	Asn	
225					230				235				240		
Glu	Ile	Pro	Asn	Trp	Ser	Val	Val	Lys	Pro	Glu	Asn	Ala	Glu	Ser	Trp
	245					250				255					
Cys	Glu	Gly	Leu	Arg	Lys	Glu	Lys	Val	Ile	Gly	Cys	Tyr	Gln	Leu	Met
	260					265				270					

Gln	Glu	Leu	Val	Ile	Asn	Asn	Asn	Gln	Arg	Lys	Leu	Pro	Leu	Leu	Lys
	275				280					285					
Val	Leu	Pro	Gln	Leu	Arg	Val	Thr	Thr	Arg	Thr	Arg	Met	Arg	Ser	Ser
	290				295				300						
Thr	Val	Ser	Ser	Phe	Ser	Ser	Ser	Ser	Thr	Ser	Phe	Ser	Leu	Ser	
305				310				315					320		
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Asn Ser Glu

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<211> 1994  
<212> DNA  
<213> Glycine max

<400> 13

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<211> 318  
<212> PRT  
<213> Glycine max

<400> 14  
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35 40 45

Ser Arg Ser Leu Asp Ala Ser Ala Arg Glu Glu Ser Val Ala Trp Ile  
50 55 60

Leu Lys Val Gln Ala Tyr Tyr Ala Phe Gln Pro Val Thr Ala Tyr Leu  
65 70 75 80

Ser Val Asn Tyr Leu Asp Arg Phe Leu Asn Ser Arg Pro Leu Pro Pro  
85 90 95

Lys Thr Asn Gly Trp Pro Leu Gln Leu Leu Ser Val Ala Cys Leu Ser  
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Leu Ala Ala Lys Met Glu Glu Ser Leu Val Pro Ser Leu Leu Asp Leu  
 115 120 125

Gln Val Glu Gly Ala Lys Tyr Val Phe Glu Pro Lys Thr Ile Arg Arg  
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Met	Glu	Leu	Leu	Val	Leu	Gly	Val	Leu	Asp	Trp	Arg	Leu	Arg	Ser	Val
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Thr Pro Phe Ser Phe Leu Asp Phe Phe Ala Cys Lys Leu Asp Ser Thr  
165 170 175

Gly Thr Phe Thr Gly Phe Leu Ile Ser Arg Ala Thr Gln Ile Ile Leu  
180 185 190

Ser Asn Ile Gln Glu Ala Ser Phe Leu Ala Tyr Trp Pro Ser Cys Ile  
 195 200 205

Ala Ala Ala Ala Ile Leu His Ala Ala Asn Glu Ile Pro Asn Trp Ser  
210 215 220

Leu Val Arg Pro Glu His Ala Glu Ser Trp Cys Glu Gly Leu Arg Lys  
225 230 235 240

Glu Lys Ile Ile Gly Cys Tyr Gln Leu Met Gln Glu Leu Val Ile Asp  
245 250 255

Asn Asn Gln Arg Lys Pro Pro Lys Val Leu Pro Gln Leu Arg Val Thr  
260 265 270

Ile Ser Arg Pro Ile Met Arg Ser Ser Val Ser Ser Phe Leu Ala Ser  
275 280 285

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290 295 300

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<210> 15

<211> 570

<212> DNA

<213> Triticum aestivum

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<222> (558)

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<211> 75

<212> PRT

<213> Triticum aestivum

<220>

<221> UNSURE

<222> (68)

<400> 16

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20 25 30

Ser Asp Asn Thr Tyr Thr Arg Glu Gln Ile Leu Arg Met Glu Lys Ala  
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Ile Leu Asn Met Leu Glu Trp Asn Leu Thr Val Pro Thr Pro Tyr Val  
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Phe Leu Val Xaa Phe Ala Lys Ala Ala Ser Ser  
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<210> 17  
<211> 1932  
<212> DNA  
<213> Zea mays

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<210> 18  
<211> 388  
<212> PRT  
<213> Zea mays

<400> 18  
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 35 40 45

Phe Gly Ala Asp Leu Phe Pro Pro Gln Ser Glu Glu Cys Val Ala Gly  
 50 55 60

Leu Val Glu Arg Glu Arg Asp His Met Pro Gly Pro Cys Tyr Gly Asp  
 65 70 75 80

Arg Leu Arg Gly Gly Cys Leu Cys Val Arg Arg Glu Ala Val  
 85 90 95

Asp Trp Ile Trp Lys Ala Tyr Thr His His Arg Phe Arg Pro Leu Thr  
 100 105 110

Ala Tyr Leu Ala Val Asn Tyr Leu Asp Arg Phe Leu Ser Leu Ser Glu  
 115 120 125

Val Pro Asp Cys Lys Asp Trp Met Thr Gln Leu Leu Ala Val Ala Cys  
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Val Ser Leu Ala Ala Lys Met Glu Glu Thr Ala Val Pro Gln Cys Leu  
 145 150 155 160

Asp Leu Gln Glu Val Gly Asp Ala Arg Tyr Val Phe Glu Ala Lys Thr  
 165 170 175

Val Gln Arg Met Glu Leu Leu Val Leu Thr Thr Leu Asn Trp Arg Met  
 180 185 190

His Ala Val Thr Pro Phe Ser Tyr Val Asp Tyr Phe Leu Asn Lys Leu  
 195 200 205

Asn Asn Gly Gly Ser Thr Ala Pro Arg Ser Cys Trp Leu Leu Gln Ser  
 210 215 220

Ala Glu Leu Ile Leu Arg Ala Ala Arg Gly Thr Gly Cys Val Gly Phe  
 225 230 235 240

Arg Pro Ser Glu Ile Ala Ala Val Ala Ala Ala Val Ala Gly Asp  
 245 250 255

Val Asp Asp Ala Asp Gly Val Glu Asn Ala Cys Cys Ala His Val Asp  
 260 265 270

Lys Glu Arg Val Leu Arg Cys Gln Glu Ala Ile Gly Ser Met Ala Ser  
 275 280 285

Ser Ala Ala Ile Asp Asp Ala Thr Val Pro Pro Lys Ser Ala Arg Arg  
 290 295 300

Arg Ser Ser Pro Val Pro Val Pro Gln Ser Pro Val Gly Val Leu Asp  
 305 310 315 320

Ala Ala Pro Cys Leu Ser Tyr Arg Ser Glu Glu Ala Ala Thr Ala Thr  
 325 330 335

Ala Thr Ala Thr Ser Ala Ala Ser His Gly Ala Pro Gly Ser Ser Ser  
 340 345 350

Ser Ser Ser Thr Ser Pro Val Thr Ser Lys Arg Arg Lys Leu Ala Ser  
 355 360 365

Arg Cys Asp Gly Ser Cys Ser Asp Arg Ser Lys Arg Ala Pro Ala Gln  
 370 375 380

Trp Thr Lys Glu  
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<210> 19  
<211> 481  
<212> DNA  
<213> Oryza sativa

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<222> (88)

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<210> 20  
 <211> 110  
 <212> PRT  
 <213> Oryza sativa

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 <221> UNSURE  
 <222> (26)

<220>  
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 <222> (40)

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Arg Ala Ala Ala Ile Ser Ala Xaa Asp Ile Gln Arg Gly Glu Glu Phe  
 35 40 45

Met Phe Asp Glu Ala Lys Ile Gln Arg Met Glu Gln Met Val Leu Asn  
 50 55 60

Ala Leu Glu Trp Arg Thr Arg Ser Val Thr Pro Leu Ala Phe Leu Gly  
 65 70 75 80

Phe Phe Leu Ser Ala Trp Phe Pro Gln Ala Ala Ala Pro Gly Ala Ala  
 85 90 95

Arg Cys His Xaa Gly Arg Ala Val Glu Leu Leu Leu Arg Val  
100 105 110

<210> 21

<211> 789

<212> DNA

<213> Triticum aestivum

<400> 21

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<211> 163

<212> PRT

<213> Triticum aestivum

<220>

<221> UNSURE

<222> (28)

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<221> UNSURE

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<221> UNSURE

<222> (138)

<400> 22

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Ser Ala Phe Glu Ala Arg Thr Ile Lys Val Met Glu Leu Leu Val Phe  
35 40 45

Ser Thr Leu Lys Trp Arg Met Gln Ala Val Thr Ala Cys Ser Phe Ile  
50 55 60

Asp Tyr Phe Leu Cys Lys Phe Asn Asp His Asp Thr Pro Ser Met Leu  
65 70 75 80

Ala Phe Ser Cys Ser Thr Asp Leu Ile Leu Ser Thr Thr Lys Xaa Ala  
85 90 95

Asp Phe Leu Val Phe Arg His Ser Glu Ile Ala Gly Ser Val Ala Leu  
100 105 110

Pro Ser Phe Gly Glu His Lys Thr Ser Val Val Glu Met Ala Thr Thr  
115 120 125

Asn Cys Lys Tyr Ile Asn Lys Gly Val Xaa Cys Asp Arg Lys Asp Pro  
130 135 140

Asp Glu Val Leu Pro Leu Trp Asn Ala Tyr Leu Lys Phe Gly Leu Arg  
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Asp Met Leu

<210> 23  
<211> 603  
<212> DNA  
<213> Zea mays

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<210> 24  
<211> 318  
<212> PRT  
<213> Zea mays

<400> 24  
Asn Ser Ala Arg Ala Ala Val Gly Trp Val Ser Arg Ala Ala Ala Arg  
1 5 10 15

Leu Gly Phe Ser Ala Leu Thr Ala Ala Leu Ala Ala Ala Tyr Leu Asp  
20 25 30

Arg Cys Phe Leu Pro Gly Gly Ala Leu Arg Leu Gly Asp Gln Pro Trp  
35 40 45

Met Ala Arg Leu Ala Ala Val Thr Cys Phe Ala Leu Ala Ala Lys Val  
50 55 60

Glu Glu Thr Arg Val Pro Pro Leu Leu Asp Leu Gln Leu Tyr Ala Ala  
65 70 75 80

Ala Asp Ala Ala Asp Pro Tyr Val Phe Glu Ala Lys Thr Val Arg Arg  
85 90 95

Met Glu Leu Leu Val Leu Ser Ala Leu Gly Trp Arg Met His Pro Val  
100 105 110

Thr Pro Phe Ser Tyr Leu Gln Pro Val Leu Ala Asp Ala Ala Thr Arg  
115 120 125

Leu Arg Ser Cys Glu Gly Val Leu Leu Ala Val Met Ala Asp Trp Arg  
130 135 140

Trp Pro Arg His Arg Pro Ser Ala Trp Ala Ala Ala Leu Leu Ile  
145 150 155 160

Thr Ala Ala Ala Gly Asp Gly Asp Gly Asp Gly Asp Thr Glu Leu  
165 170 175

Leu Ala Leu Ile Asn Ala Pro Glu Asp Lys Thr Ala Glu Cys Ala Lys  
180 185 190

Ile Ile Ser Glu Val Thr Gly Met Ser Phe Leu Ala Cys Asp Val Gly  
195 200 205

Val Ser Ala Gly Asn Lys Arg Lys His Ala Ala Ala Gln Leu Tyr Ser  
210 215 220

Pro Pro Pro Ser Pro Ser Gly Val Ile Gly Ala Leu Ser Cys Phe Ser  
225 230 235 240

Cys Glu Ser Ser Thr Ser Ala Thr Ala Met Ala Ala Ala Val Gly Pro  
245 250 255

Trp Ala Pro Ser Ala Ser Val Ser Val Ser Ser Ser Pro Glu Pro Pro  
260 265 270

Gly Arg Ala Pro Lys Arg Ala Ala Ala Ser Ala Ser Ala Ser Ala  
275 280 285

Ser Ala Gly Val Ala Pro Pro Val Gln Val Pro His Gln Leu Pro Pro  
290 295 300

Asp Glu Glu Ser Arg Asp Ala Trp Pro Ser Thr Cys Ala Ala  
305 310 315

<210> 25  
<211> 674  
<212> DNA  
<213> Glycine max

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<220>  
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<221> unsure  
<222> (640)

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<220>  
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<400> 25  
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tccttctcca tcggggcatt ccgcactctc catccccataaa aagtcccaga tccaaagatgg 120  
cttaccacca tcaaaaatcc cttttgacca ccctataactg ctccgaagag cattggatag 180  
gggaagggtga atttgaccaa gcagaggagg agtacggtaa cagtaatagc aatagtagca 240  
gcaccttagt aaacaactcc cctgagtcct cccctcattt gttgctcgaa agcgacatgt 300  
tttgggacga acaagagttg gcatcgctgt tggagaaaaga acaacacaac ccactaagca 360  
cttgctgtct ccaaaggcaac cctgccttgg agggtgctcg catagaagcc gtggagtgg 420  
ttctcaaagt aaacgcccac tactccttct ctgcctcact cgctgttctt gctgtcaact 480  
actttgacccg ttttcttcc agcttccgct ttccagaatga cattaancca tggatgactc 540  
ggggtcgctg ccgtcgcttgc nctctccctc gctgccaaag tgggcgagac acacgttccc 600  
tttcttattt gacccttcaa caaaagtggaa ggaggagttt atnctttgtt ccaagccaaa 660  
gacgattaaaa aaag 674

<210> 26  
<211> 186  
<212> PRT  
<213> Glycine max

<220>  
<221> UNSURE  
<222> (137)

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<222> (149)

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<222> (175)..(176)

<400> 26  
Met Ala Tyr His His Gln Lys Ser Leu Leu Asp Thr Leu Tyr Cys Ser  
1 5 10 15

Glu Glu His Trp Ile Gly Glu Gly Glu Phe Asp Gln Ala Glu Glu Glu  
20 25 30

Tyr	Gly	Asn	Ser	Asn	Ser	Asn	Ser	Ser	Ser	Thr	Leu	Val	Asn	Asn	Ser
35							40						45		
Pro	Glu	Ser	Ser	Pro	His	Leu	Leu	Leu	Glu	Ser	Asp	Met	Phe	Trp	Asp
50						55					60				
Glu	Gln	Glu	Leu	Ala	Ser	Leu	Leu	Glu	Lys	Glu	Gln	His	Asn	Pro	Leu
65					70				75				80		
Ser	Thr	Cys	Cys	Leu	Gln	Ser	Asn	Pro	Ala	Leu	Glu	Gly	Ala	Arg	Ile
85							90						95		
Glu	Ala	Val	Glu	Trp	Ile	Leu	Lys	Val	Asn	Ala	His	Tyr	Ser	Phe	Ser
100						105						110			
Ala	Leu	Thr	Ala	Val	Leu	Ala	Val	Asn	Tyr	Phe	Asp	Arg	Phe	Leu	Phe
115						120						125			
Ser	Phe	Arg	Phe	Gln	Asn	Asp	Ile	Xaa	Pro	Trp	Met	Thr	Arg	Gly	Arg
130					135						140				
Cys	Arg	Arg	Leu	Xaa	Leu	Pro	Arg	Cys	Gln	Ser	Gly	Arg	Asp	Thr	Arg
145					150				155				160		

Ser	Leu	Ser	Tyr	Leu	Thr	Leu	Gln	Gln	Ser	Gly	Arg	Arg	Ser	Xaa	Xaa
165						170							175		

Phe	Val	Pro	Ser	Gln	Arg	Arg	Leu	Lys	Lys	
180							185			

<210>	27
<211>	554
<212>	DNA
<213>	Glycine max

<400>	27					
ctccctttca	cctttcttca	tagcctacca	cttttctgct	ttcatctact	ctcacttctc	60
ttcacacact	gagacacaca	gagagagaaa	aataaagggt	gtgatgggtg	tcttactgag	120
tgttttctt	ttataatgaa	caaagaactg	cacaccctct	tcttcaccga	agaagaagat	180
ggcaattcag	caccacaaatg	accaactaga	gcataatgaa	aatgtctcat	ctgtccttga	240
tgccctttac	tgtgacgaag	gaaagttggaa	agaggaagag	gaggagaaag	aagaagaaga	300
agatgaaggt	gaaaatgaaa	gtgaagtgc	aacaaacact	gcaacttgc	ttttccctct	360
gctcttgg	gagcaagact	tgttctggaa	agatgaggaa	ctaaactcta	tctttcccaa	420
agagaaggtt	caacatgaag	aagcctatgg	tataacaatc	tgaacagtga	tgtgtataac	480
aacaacaaca	atactagtat	ataatgtat	ttggctcttg	ctcttcagct	cgtcgagcg	540
tgtatgtatgt	gaat					554

<210>	28
<211>	94
<212>	PRT
<213>	Glycine max

<400>	28														
Met	Ala	Ile	Gln	His	His	Asn	Asp	Gln	Leu	Glu	His	Asn	Glu	Asn	Val
1							5			10			15		

Ser	Ser	Val	Leu	Asp	Ala	Leu	Tyr	Cys	Asp	Glu	Gly	Lys	Trp	Glu	Glu
20							25					30			

Glu	Asp	Glu	Gly	Glu	Glu	Asn	Glu	Ser						
35						40						45		

Glu	Val	Thr	Thr	Asn	Thr	Ala	Thr	Cys	Leu	Phe	Pro	Leu	Leu	Leu
50						55					60			

Glu Gln Asp Leu Phe Trp Glu Asp Glu Glu Leu Asn Ser Ile Phe Ser  
65 70 75 80

Lys Glu Lys Val Gln His Glu Glu Ala Tyr Gly Ile Thr Ile  
85 90

<210> 29  
<211> 372  
<212> PRT  
<213> Catharanthus roseus

<400> 29

Met Ala Asp Lys Glu Asn Cys Ile Arg Val Thr Arg Leu Ala Lys Lys  
1 5 10 15

Arg Ala Val Glu Ala Met Ala Ala Ser Glu Gln Gln Arg Pro Ser Lys  
20 25 30

Lys Arg Val Val Leu Gly Glu Leu Lys Asn Leu Ser Ser Asn Ile Ser  
35 40 45

Ser Ile Gln Thr Tyr Asp Phe Ser Ser Gly Pro Gln Lys Gln Gln Lys  
50 55 60

Asn Lys Asn Lys Arg Lys Ala Lys Glu Ser Leu Gly Phe Glu Val Lys  
65 70 75 80

Glu Lys Lys Val Glu Glu Ala Gly Ile Asp Val Phe Ser Gln Ser Asp  
85 90 95

Asp Pro Gln Met Cys Gly Ala Tyr Val Ser Asp Ile Tyr Glu Tyr Leu  
100 105 110

His Lys Met Glu Met Glu Thr Lys Arg Arg Pro Leu Pro Asp Tyr Leu  
115 120 125

Asp Lys Val Gln Lys Asp Val Thr Ala Asn Met Arg Gly Val Leu Ile  
130 135 140

Asp Trp Leu Val Glu Val Ala Glu Glu Tyr Lys Leu Leu Pro Asp Thr  
145 150 155 160

Leu Tyr Leu Thr Val Ser Tyr Ile Asp Arg Phe Leu Ser Met Asn Ala  
165 170 175

Leu Ser Arg Gln Lys Leu Gln Leu Leu Gly Val Ser Ser Met Leu Ile  
180 185 190

Ala Ser Lys Tyr Glu Glu Ile Ser Pro Pro His Val Glu Asp Phe Cys  
195 200 205

Tyr Ile Thr Asp Asn Thr Tyr Lys Lys Glu Glu Val Val Lys Met Glu  
210 215 220

Ala Asp Val Leu Lys Phe Leu Lys Phe Glu Met Gly Asn Pro Thr Ile  
225 230 235 240

Lys Thr Phe Leu Arg Arg Leu Thr Arg Val Val Gln Asp Gly Asp Lys  
245 250 255

Asn Pro Asn Leu Gln Phe Glu Phe Leu Gly Tyr Tyr Leu Ala Glu Leu  
260 265 270

Ser Leu Leu Asp Tyr Gly Cys Val Lys Phe Leu Pro Ser Leu Ile Ala  
275 280 285

Ser Ser Val Ile Phe Leu Ser Arg Phe Thr Leu Gln Pro Lys Val His  
 290 295 300  
 Pro Trp Asn Ser Leu Leu Gln His Asn Ser Gly Tyr Lys Pro Ala Asp  
 305 310 315 320  
 Leu Lys Glu Cys Val Leu Ile Ile His Asp Leu Gln Leu Ser Lys Arg  
 325 330 335  
 Gly Ser Ser Leu Val Ala Val Arg Asp Lys Tyr Lys Gln His Lys Phe  
 340 345 350  
 Lys Cys Val Ser Thr Leu Thr Ala Pro Pro Ser Ile Pro Asp Glu Phe  
 355 360 365  
 Phe Glu Asp Ile  
 370  
 <210> 30  
 <211> 335  
 <212> PRT  
 <213> Arabidopsis thaliana

<400> 30  
 Met Arg Ser Tyr Arg Phe Ser Asp Tyr Leu His Met Ser Val Ser Phe  
 1 5 10 15  
 Ser Asn Asp Met Asp Leu Phe Cys Gly Glu Asp Ser Gly Val Phe Ser  
 20 25 30  
 Gly Glu Ser Thr Val Asp Phe Ser Ser Ser Glu Val Asp Ser Trp Pro  
 35 40 45  
 Gly Asp Ser Ile Ala Cys Phe Ile Glu Asp Glu Arg His Phe Val Pro  
 50 55 60  
 Gly His Asp Tyr Leu Ser Arg Phe Gln Thr Arg Ser Leu Asp Ala Ser  
 65 70 75 80  
 Ala Arg Glu Asp Ser Val Ala Trp Ile Leu Lys Val Gln Ala Tyr Tyr  
 85 90 95  
 Asn Phe Gln Pro Leu Thr Ala Tyr Leu Ala Val Asn Tyr Met Asp Arg  
 100 105 110  
 Phe Leu Tyr Ala Arg Arg Leu Pro Glu Thr Ser Gly Trp Pro Met Gln  
 115 120 125  
 Leu Leu Ala Val Ala Cys Leu Ser Leu Ala Ala Lys Met Glu Glu Ile  
 130 135 140  
 Leu Val Pro Ser Leu Phe Asp Phe Gln Val Ala Gly Val Lys Tyr Leu  
 145 150 155 160  
 Phe Glu Ala Lys Thr Ile Lys Arg Met Glu Leu Leu Val Leu Ser Val  
 165 170 175  
 Leu Asp Trp Arg Leu Arg Ser Val Thr Pro Phe Asp Phe Ile Ser Phe  
 180 185 190  
 Phe Ala Tyr Lys Ile Asp Pro Ser Gly Thr Phe Leu Gly Phe Phe Ile  
 195 200 205  
 Ser His Ala Thr Glu Ile Ile Leu Ser Asn Ile Lys Glu Ala Ser Phe  
 210 215 220

Leu Glu Tyr Trp Pro Ser Ser Ile Ala Ala Ala Ala Ile Leu Cys Val  
225 230 235 240

Ala Asn Glu Leu Pro Ser Leu Ser Ser Val Val Asn Pro His Glu Ser  
245 250 255

Pro Glu Thr Trp Cys Asp Gly Leu Ser Lys Glu Lys Ile Val Arg Cys  
260 265 270

Tyr Arg Leu Met Lys Ala Met Ala Ile Glu Asn Asn Arg Leu Asn Thr  
275 280 285

Pro Lys Val Ile Ala Lys Leu Arg Val Ser Val Arg Ala Ser Ser Thr  
290 295 300

Leu Thr Arg Pro Ser Asp Glu Ser Ser Ser Pro Cys Lys Arg Arg Lys  
305 310 315 320

Leu Ser Gly Tyr Ser Trp Val Gly Asp Glu Thr Ser Thr Ser Asn  
325 330 335

<210> 31

<211> 354

<212> PRT

<213> Nicotiana tabacum

<400> 31

Met Ala Ala Asp Asn Ile Tyr Asp Phe Val Ala Ser Asn Leu Leu Cys  
1 5 10 15

Thr Glu Thr Lys Ser Leu Cys Phe Asp Asp Val Asp Ser Leu Thr Ile  
20 25 30

Ser Gln Gln Asn Ile Glu Thr Lys Ser Lys Asp Leu Ser Phe Asn Asn  
35 40 45

Gly Ile Arg Ser Glu Pro Leu Ile Asp Leu Pro Ser Leu Ser Glu Glu  
50 55 60

Cys Leu Ser Phe Met Val Gln Arg Glu Met Glu Phe Leu Pro Lys Asp  
65 70 75 80

Asp Tyr Val Glu Arg Leu Arg Ser Gly Asp Leu Asp Leu Ser Val Arg  
85 90 95

Lys Glu Ala Leu Asp Trp Ile Leu Lys Ala His Met His Tyr Gly Phe  
100 105 110

Gly Glu Leu Ser Phe Cys Leu Ser Ile Asn Tyr Leu Asp Arg Phe Leu  
115 120 125

Ser Leu Tyr Glu Leu Pro Arg Ser Lys Thr Trp Thr Val Gln Leu Leu  
130 135 140

Ala Val Ala Cys Leu Ser Leu Ala Ala Lys Met Glu Glu Ile Asn Val  
145 150 155 160

Pro Leu Thr Val Asp Leu Gln Val Gly Asp Pro Lys Phe Val Phe Glu  
165 170 175

Gly Lys Thr Ile Gln Arg Met Glu Leu Leu Val Leu Ser Thr Leu Lys  
180 185 190

Trp Arg Met Gln Ala Tyr Thr Pro Tyr Thr Phe Ile Asp Tyr Phe Met  
195 200 205

Arg Lys Met Asn Gly Asp Gln Ile Pro Ser Arg Pro Leu Ile Ser Gly  
210 215 220

Ser Met Gln Leu Ile Leu Ser Ile Ile Arg Ser Ile Asp Phe Leu Glu  
225 230 235 240

Phe Arg Ser Ser Glu Ile Ala Ala Ser Val Ala Met Ser Val Ser Gly  
245 250 255

Glu Ile Gln Ala Lys Asp Ile Asp Lys Ala Met Pro Cys Phe Phe Ile  
260 265 270

His Leu Asp Lys Gly Arg Val Gln Lys Cys Val Glu Leu Ile Gln Asp  
275 280 285

Leu Thr Thr Ala Thr Ile Thr Thr Ala Ala Ala Ala Ser Leu Val Pro  
290 295 300

Gln Ser Pro Ile Gly Val Leu Glu Ala Ala Ala Cys Leu Ser Tyr Lys  
305 310 315 320

Ser Gly Asp Glu Arg Thr Val Gly Ser Cys Thr Thr Ser Ser His Thr  
325 330 335

Lys Arg Arg Lys Leu Asp Thr Ser Ser Leu Glu His Gly Thr Ser Glu  
340 345 350

Lys Leu

<210> 32  
<211> 373  
<212> PRT  
<213> Nicotiana tabacum

<400> 32  
Met Ala Ile Glu His Asn Glu Gln Gln Glu Leu Ser Gln Ser Phe Leu  
1 5 10 15

Leu Asp Ala Leu Tyr Cys Glu Glu Glu Glu Lys Trp Gly Asp Leu  
20 25 30

Val Asp Asp Glu Thr Ile Ile Thr Pro Leu Ser Ser Glu Val Thr Thr  
35 40 45

Thr Thr Thr Thr Thr Lys Pro Asn Ser Leu Leu Pro Leu Leu Leu  
50 55 60

Leu Glu Gln Asp Leu Phe Trp Glu Asp Glu Glu Leu Leu Ser Leu Phe  
65 70 75 80

Ser Lys Glu Lys Glu Thr His Cys Trp Phe Asn Ser Phe Gln Asp Asp  
85 90 95

Ser Leu Leu Cys Ser Ala Arg Val Asp Ser Val Glu Trp Ile Leu Lys  
100 105 110

Val Asn Gly Tyr Tyr Gly Phe Ser Ala Leu Thr Ala Val Leu Ala Ile  
115 120 125

Asn Tyr Phe Asp Arg Phe Leu Thr Ser Leu His Tyr Gln Lys Asp Lys  
130 135 140

Pro Trp Met Ile Gln Leu Ala Ala Val Thr Cys Leu Ser Leu Ala Ala  
145 150 155 160

Lys Val Glu Glu Thr Gln Val Pro Leu Leu Leu Asp Phe Gln Val Glu  
165 170 175

Asp Ala Lys Tyr Val Phe Glu Ala Lys Thr Ile Gln Arg Met Glu Leu  
180 185 190

Leu Val Leu Ser Ser Leu Lys Trp Arg Met Asn Pro Val Thr Pro Leu  
195 200 205

Ser Phe Leu Asp His Ile Ile Arg Arg Leu Gly Leu Arg Asn Asn Ile  
210 215 220

His Trp Glu Phe Leu Arg Arg Cys Glu Asn Leu Leu Leu Ser Ile Met  
225 230 235 240

Ala Asp Cys Arg Phe Val Arg Tyr Met Pro Ser Val Leu Ala Thr Ala  
245 250 255

Ile Met Leu His Val Ile His Gln Val Glu Pro Cys Asn Ser Val Asp  
260 265 270

Tyr Gln Asn Gln Leu Leu Gly Val Leu Lys Ile Asn Lys Glu Lys Val  
275 280 285

Asn Asn Cys Phe Glu Leu Ile Ser Glu Val Cys Ser Lys Pro Ile Ser  
290 295 300

His Lys Arg Lys Tyr Glu Asn Pro Ser His Ser Pro Ser Gly Val Ile  
305 310 315 320

Asp Pro Ile Tyr Ser Ser Glu Ser Ser Asn Asp Ser Trp Asp Leu Glu  
325 330 335

Ser Thr Ser Ser Tyr Phe Pro Val Phe Lys Lys Ser Arg Val Gln Glu  
340 345 350

Gln Gln Met Lys Leu Ala Ser Ser Ile Ser Arg Val Phe Val Glu Ala  
355 360 365

Val Gly Ser Pro His  
370